Equations of lines of Regression.

(1) **Regression line of y on x:**If value of x is known, then value of y can be found as

$$y-\bar{y}=\frac{Cov(x,y)}{\sigma_x^2}(x-\bar{x}) \text{ or } y-\bar{y}=r\frac{\sigma_y}{\sigma_x}(x-\bar{x})$$

(2) **Regression line of x on y:**It estimates x for the given value of y as

$$x-\bar{x}=\frac{Cov(x,y)}{\sigma_y^2}(y-\bar{y}) \text{ or } x-\bar{x}=r\frac{\sigma_x}{\sigma_y}(y-\bar{y})$$

(3) **Regression coefficient:**(i) Regression coefficient of y on x is $b_{yx}=\frac{r\sigma_y}{\sigma_x}=\frac{Cov(x,y)}{\sigma_x^2}$

(ii) Regression coefficient of x on y is $b_{xy}=\frac{r\sigma_x}{\sigma_y}=\frac{Cov(x,y)}{\sigma_y^2}$.